

Title	Weld aluminium to industry standard in the downhand positions using the gas tungsten arc welding process		
Level	3	Credits	6

Purpose	<p>This unit standard is for people welding aluminium structures in the downhand positions to Category B of AS/NZS 1665 or equivalent standards or codes, using the gas tungsten arc welding process (GTAW).</p> <p>People credited with this unit standard are able to prepare to weld; and weld aluminium in the downhand positions using the GTAW process; and inspect and repair aluminium GTAW welds.</p>
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Classification	Mechanical Engineering > Welding
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Available grade	Achieved
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Prerequisites	Unit 29651, <i>Demonstrate knowledge of health and safety when welding and thermal cutting</i> , or demonstrate equivalent knowledge and skills.
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Guidance Information

- References

Health and Safety at Work Act 2015.

Health and Safety in Welding. Wellington: Department of Labour, 2006. Available from <http://www.worksafe.govt.nz>.

AS/NZS 1665:2004, *Welding of aluminium structures*.
- Definitions

Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

Aluminium – weldable aluminium alloys.

GTAW – Gas Tungsten Arc Welding; also referred to as *Tungsten Inert Gas* (TIG) welding.

Industry standard – Category B of AS/NZS 1665:2004, or equivalent.

Welding procedure – refers to a written work instruction providing all the necessary technical details for a specific welding application.

3 Related unit standards

This unit standard is one of an aluminium gas tungsten arc welding set:

- Unit 22907, *Demonstrate and apply knowledge of welding aluminium and stainless steel* (Level 3); an introductory standard to provide foundation awareness for aluminium and stainless steel, generally delivered off job.
- Unit 2677, *Weld aluminium to industry standard in the downhand positions using the gas tungsten arc welding process* (Level 3); a progressive aluminium specific industry standard.
- Unit 2689, *Weld aluminium in all positions using the gas tungsten arc welding process* (Level 4); a trade level aluminium specific industry standard.

Outcomes and performance criteria

Outcome 1

Prepare to weld aluminium in the downhand positions using the GTAW process.

Performance criteria

1.1 Equipment is selected to meet welding procedure requirements.

Range power source rating and duty cycle, torch, shielding gas supply, welding cables, work clamp.

1.2 Equipment is assembled and maintained ready for use in accordance with manufacturer's instructions.

Range torch, shielding gas supply, welding cables, work clamp.

1.3 Aluminium components are prepared and assembled in accordance with welding procedure.

Range edge preparation, cleaning, tack welding to correct alignment and preset.

1.4 Consumables are selected in accordance with welding procedure.

Range filler rods are identified by specification and classification; shielding gases are identified by brand name and composition.

Outcome 2

Weld aluminium in the downhand positions using the GTAW process.

Range four welds or test pieces:
 material thickness 2 to 3.2 mm – 1G butt weld, 2F tee weld;
 material thickness 5 to 6 mm – 1G butt weld, 2F tee weld (section to plate to include welding into a corner).

Performance criteria

- 2.1 Workplace safety procedures are followed.
- Range examples are – use of personal protective equipment, checking of equipment for faults, use of fume extraction equipment, elimination of risk of fire or explosion, protection from arc radiation.
- 2.2 Welds are deposited on aluminium to industry standard and in accordance with welding procedure.
- 2.3 Component damage is minimised and distortion is controlled during welding and handling in accordance with accepted industry practice.
- 2.4 Welds are cleaned in accordance with accepted industry practice.

Outcome 3

Inspect and repair aluminium GTAW welds.

Performance criteria

- 3.1 Weld imperfections are identified by visual examination and workshop tests.
- Range examples of workshop tests are – nick break, fillet break-over, bend, macro examination. One workshop test is required for each weld from outcome 2.
- 3.2 Weld imperfections are compared to the permissible levels allowed by the industry standard.
- 3.3 A weld defect is repaired to industry standard.

Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	30 November 1994	31 December 2022
Revision	2	14 April 1997	31 December 2022
Revision	3	5 January 1999	31 December 2022
Review	4	4 April 2001	31 December 2022
Rollover and Revision	5	20 April 2006	31 December 2022
Review	6	22 May 2009	31 December 2022
Review	7	20 July 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.